R & D CATALOG FORM		9 April 1965
. PROJECT TITLE/CODE NAME	2. SHORT PROJECT DESCRIPTION	
	This project is to dev	elop a rear-projection screer
Image Intensifier Screen	which will, itself, inten	sify the brightness of an
	image projected upon it.	
CONTRACTOR NAME	4. LOCATION OF	CONTRACTOR
5. CLASS OF CONTRACTOR	6. TYPE OF CONTRACT	<u> </u>
Manufacturer	CPFF	
. FUNDS	8. REQUISITION NO.	9. BUDGET PROJECT NO.
TT 10 (T		
FY 1965	NA	NP-V-5
EX 10.66	10. EFFECTIVE CONTRACT DATE	11. SECURITY CLASS.
FY 1966	(Begin - end)	A. A Confidential
EV 10 ¢	Mars 3065 War 3067	T Unclassified
FY 19 \$	May 1965-May 1967	W Unclassified
RESPONSIBLE DIRECTORATE/OFFICE/P	ROJECT OFFICER TELEPHONE EXTENSION	
DDI/NPIC/P&DS	7	Declass Review by NGA
REQUIREMENT/AUTHORITY		
Purploitetion of large		
Exploitation of large vol	umes of reconnaissance phot	ography requires scanning
using rear-projection scree	ns. A successful screen of	this type would have wide
using rear-projection scree application in all devices	umes of reconnaissance photens. A successful screen of employing rear-projection s	this type would have wide
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19. APPROVED BY AND DATE

OFFICE DEPUTY DIRECTOR DDC1

magnification, in turn, requires considerable increase in the power of the projection

screen. Increased lamp power is accompanied by greatly increased heat incident (Contd)

5X1

5X1

5X1

X1

human visual system to perceive the total information content. This high

lamp in order to obtain the necessary image brightness over the entire viewing



5X1

R & D CATALOG FORM (Continued)...

18. upon the film to the extent that the film becomes distorted or damaged. There are in existence various techniques for cooling the film at the film plane; e.g., dichroic mirrors, fans, liquid gates, etc. In spite of these techniques, stationary or slowly moving film is still subject to heat damage at high magnifications.

It has been postulated that this problem might be solved by intensifying the image at the viewing screen. Such a screen would require minimal power in the projection illumination, but would produce a bright image for the viewer.

The primary objective is that, under nominal highlight illumination of approximately 10 foot candles, the image-intensifier screen should provide the viewer with an image of adequate gain and brightness while still exhibiting satisfactory performance in many other aspects, such as, resolution, tonal range, linearity, color temperature, viewing angle, response time, size, screen life and cost.

A secondary objective is to provide a possible means for controlling modulation of image contrast, such as tone-reversal and gray scale compression or expansion.

This project is directed toward the development of an advanced image intensifier screen. It is a reflective system and incorporates a grid-controlled photo conductor (PC) layer and utilizes VARAD dipole material as an output layer in place of the more common (EL) electroluminescent material, or phosphor. VARAD is not self-luminous but is, rather, a modulator of light in that it varies its reflectance, transmittance or absorptance in response to an applied electric field. In the contemplated system, the photo transparency is projected so that it is imaged on the rear of the image intensifier screen thereby exciting the photo conductor which, in turn, selectively varies the electric field. The more light falling on an area, the greater the field strength, thereby causing the suspended particles in the VARAD cell to align with the field. Where the particles are aligned, the VARAD becomes transparent and passes light; conversely, where the particles are randomly dispersed they absorb. A reflective layer is placed between the VARAD and the photo conductor; consequently, when the screen is lighted fromin front, light passes through the aligned particles and is reflected; therefore, these areas appear bright while light striking the unaligned particles is absorbed and these areas, inturn, appear black or intermediate tones of grey depending upon the degree of particle alignment.

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R & D CATALOG FORM (Continued)...

- 18. The following goals are to be achieved or approached during the course of the proposed program:
 - a. Light output approaching 200 foot-lamberts at 100%.
 - b. Resolution of at least 10 lines/mm.
 - c. Flicker free display.
 - d. Dynamic tonal range of 20 grey steps.
 - e. Screen size of 12" by 12" capable of expansion to 30" x 30".
 - f. Signal-to-noise ratio greater then 100.
 - g. Unity gamma over a range of brightness of 100:1.
 - h. Positive-or negative viewing.
 - i. Minimal energy transmitted through the film.
 - j. Variable density compression and expansion.
 - k. Long screen life expectancy.

This project will be accomplished under a 13 month program to be
funded over two fiscal years at a total cost of
funded in fiscal 1965 and in fiscal 1966. The contractor will
supply a final report one month after the delivery of the 30"x30" screen
The necessary security clearances are in effect at the contractors plant as the result of other contracts.